Appendix

31. A method of identifying differences between biopolymers, the method comprising the steps:

(a) providing different sets of labeled detector molecules in which:

at least two sets of said labeled detector molecules are specifically bondable to a certain region in said biopolymers; and

the labels of said labeled detector molecules of one of said at least two sets differ from the labels of said labeled detector molecules of another of said at least two sets;

(b) exposing said labeled detector molecules to said biopolymers under conditions permitting bonding reactions to occur to form bondings between said labeled detector molecules and said biopolymers; and

(c) evaluating said bondings via said different labels, said evaluating comprising detecting the presence and intensity of labeled detector molecules at selected regions of said biopolymers whereby differences between said biopolymers may be identified.

32. The method according to claim 31, wherein said biopolymers are immobilized at least before step (b).

33. The method according to claim 32, wherein said biopolymers are immobilized on a carrier or in a matrix.

34. The method according to claim 31, wherein said bonding reactions between each of said labeled detector molecules and said biopolymer are carried out simultaneously or successively.

35. The method according to claim 31, wherein said bonding reaction in step (b) is a nucleic acid hybridization or an antigen/antibody reaction.

36. The method according to claim 35, wherein said nucleic acid hybridization is an *in situ* hybridization.

37. The method according to claim 31, wherein said biopolymers are nucleic acids or polypeptides.

38. The method according to claim 37, wherein said nucleic acids are DNA or RNA.

39. The method according to claim 37, wherein the nucleic acids are chromosomal DNA.

40. The method according to claim 31, wherein the labeled detector molecules are nucleic acids or antibodies.

41. The method according to claim 40, wherein said different nucleic acids are selected from different chromosome region-specific DNA libraries.

42. The method according to claim 40, wherein each of said sets of labeled detector molecules contains one or more labels different from at least one label contained in another of said sets.

43. The method according to claim 42, wherein the label comprises a fluorescent dye.

44. The method according to claim 31, wherein said evaluating step further comprises the steps:

scanning said biopolymers with a scanning device in the longitudinal direction of said biopolymers; and

recording the intensities or intensity ratios of said labels of said labeled detector molecules.

45. The method according to claim 31, wherein said step of providing different sets of labeled detector molecules further comprises providing at least one set of a localized calibrating probe, said probe comprising calibrating labels.

46. The method according to claim 47, wherein said calibrating labels comprise all of said labels of said labeled detector molecules of said at least two sets.

47. The method according to claim 31, wherein said step of providing different sets of labeled detector molecules further comprises providing a number of localized calibrating probes, said number being one less than the total number of said labels in said labeled detector molecules, each of said probes comprising two labels; and said evaluating step further comprises correcting positional deviations of said bondings by pairwise comparison of said calibrating probes.

48. The method according to claim 47, wherein said step of providing different sets of labeled detector molecules further comprises providing a plurality of said calibrating probes; and said evaluating step further comprises correcting positional transformations of said bondings by comparison of said calibrating probes.

49. The method according to claim 47, wherein said evaluating steps further comprises forming images of said biopolymers; and aligning said images with respect to said bondings, thereby providing positional correction for said bondings.

50. The method according to claim 51, wherein said step of aligning is automatic.

51. The method according to claim 47, wherein said labels of said calibrating probes have known or reproducible constant intensity whereby the signal intensities of all of said labels can be standardized.

52. The method according to claim 53, wherein said calibrating probes are fluorescence-labeled DNA probes.

53. The method according to claim 53, wherein said calibrating probes are fluorescence-labeled DNA particles.

54. The method according to claim 47, wherein said calibrating probes are used for positional correction of said bondings.

55. A method of identifying differences between similar biopolymers, said method comprising:

(a) providing at least a first set of labeled detector molecules wherein said molecules of said first set are specifically bondable to the same selected region in each of said similar biopolymers;

(b) providing at least a second set of labeled detector molecules wherein said molecules of said second set are specifically bondable to said selected region in each of said similar biopolymers and wherein the labels of said detector molecules of said second set differ from the labels of said detector molecules of said first set;

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(c) exposing said first set and said second set of labeled detector molecules to each of said similar biopolymers under conditions permitting said first set and said second set of labeled detector molecules to form bondings to said similar biopolymers;

(d) evaluating, for each of said similar biopolymers, said bondings, said evaluating comprising detecting the presence and intensity of said labels of said first and said second labeled detector molecules; and

(e) comparing the results of said evaluating for one of said similar biopolymers with the results of said evaluating for another of said similar biopolymers;

whereby differences between said respective biopolymers are identified.